CLAIMS

What is claimed is:

1. A wireless station that communicates with at least one other wireless station in a local area network (LAN), comprising:

a media access control (MAC) device that controls transitions between an active mode and a low power mode; and

a radio frequency (RF) transceiver that communicates with said MAC device and that, after said transition to said active mode, transmits data during a predetermined time slot that is assigned to said wireless LAN station and that is not assigned to other wireless LAN stations in said LAN.

2. The wireless LAN station of Claim 1 wherein said RF transceiver receives data from other wireless LAN stations in said LAN during said active mode and transitions to said low power mode after receiving said data from said other wireless LAN stations.

3. The wireless LAN station of Claim 1 wherein said MAC device transitions said wireless LAN station to said active mode prior to a timing beacon and transitions said wireless LAN station to said low power mode prior to a subsequent beacon.

4. The wireless LAN station of Claim 1 wherein after said transition to said active mode, said MAC device updates network time.

5. The wireless LAN station of Claim 4 wherein said network time is set equal to a prior beacon time plus a beacon interval minus a fixed delay.

6. The wireless LAN station of Claim 5 wherein after said fixed delay and a backoff period, said wireless LAN station transmits a beacon if said wireless LAN station has not already received a beacon.

7. The wireless LAN station of Claim 6 wherein said wireless LAN station updates network time to match a time of said received beacon.

8. The wireless LAN station of Claim 1 wherein said wireless LAN station transmits at least one frame following a short interframe space during said assigned time slot.

9. The wireless LAN station of Claim 1 wherein said assigned time slot occurs at least one of after a prior time slot expires, after a wireless LAN station with said prior time slot transmits a null frame, after a wireless LAN station with said prior time slot transmits a frame with a predetermined sequence number, and after a wireless LAN station with said prior time slot transmits a frame with a predetermined duration value.

10. The wireless LAN station of Claim 1 wherein a Distributed Coordination Function (DCF) interval is provided after a last one of said wireless LAN stations transmits data and before said wireless LAN stations transition to said low power mode.

11. The wireless LAN station of Claim 1 further comprising:

a first voltage regulator that regulates supply voltage during said active mode and that is powered down during said low power mode; and

a second voltage regulator that dissipates less power than said first voltage regulator and that regulates supply voltage during said low power mode,

wherein said MAC device selects said first voltage regulator during said active mode and said second voltage regulator during said low power mode.

12. The wireless LAN station of Claim 11 further comprising:

a baseband processor (BBP) that performs radio frequency mixing and that communicates with said MAC device and said RF transceiver;

a first phase locked loop (PLL) that generates a first clock signal for said BBP during said active mode;

a crystal oscillator that outputs a timing signal to said first PLL during said active mode,

wherein said RF transceiver communicates with said BBP and includes a second PLL that receives said timing signal from said crystal oscillator during said active mode and that generates a second clock signal for said RF transceiver.

13. The wireless LAN station of Claim 12 further comprising a first oscillator that generates a third clock signal during said low power mode, wherein said first oscillator dissipates less power than said crystal oscillator.

14. The wireless LAN station of Claim 12 wherein when said MAC device initiates said low power mode, at least one of said first voltage regulator, said RF transceiver, said first PLL, said second PLL and said crystal oscillator is shut down.

15. The wireless LAN station of Claim 13 wherein said MAC device includes a counter and wherein when said MAC device initiates said low power mode, said second voltage regulator powers said first oscillator and said counter, and wherein when said counter reaches a predetermined count, said MAC device powers up at least two of said crystal oscillator, said first voltage regulator, said RF transceiver, said first PLL and said second PLL.

16. The wireless LAN station of Claim 1 wherein said wireless LAN station is associated with a host that runs a multiplayer gaming application.

17. The wireless LAN station of Claim 13 further comprising a processor that communicates with said crystal oscillator and that calibrates said first oscillator using said timing signal from said crystal oscillator.

18. The wireless LAN station of Claim 12 wherein at least two of said BBP, said first voltage regulator, said second voltage regulator, said RF transceiver, said MAC device, and said first PLL are implemented by a system on chip (SOC).

19. The wireless LAN station of Claim 1 wherein said wireless LAN station is otherwise compliant with at least one of IEEE section 802.11, 802.11(a), 802.11(b), and 802.11(g).

20. The wireless LAN station of Claim 1 wherein said LAN is an ad-hoc network.

21. The wireless LAN station of Claim 1 wherein said wireless LAN stations are mobile stations in an ad-hoc network.

22. A wireless local area network (LAN), comprising:

a first wireless LAN station that selectively operates in low power and active modes, that initiates a LAN, and that assigns predetermined time slots for transmitting data to wireless LAN stations joining said LAN;

a second wireless LAN station that selectively operates said low power and active modes, that communicates with said first wireless LAN station, that receives one of said predetermined time slots from said first wireless LAN station for transmitting data, and that, after transitioning to said active mode, transmits data during said one of said predetermined time slots.

23. The wireless LAN of Claim 22 wherein said first wireless LAN station includes:

a first media access control (MAC) device that controls transitions between said active mode and said low power mode; and

a first radio frequency (RF) transceiver that communicates with said first MAC device, that transmits data for said first wireless LAN station during one of said predetermined time slots during said active mode, that receives data from said other wireless LAN stations in said LAN during said active mode, and that transitions to said low power mode after receiving said data from said other wireless LAN stations.

24. The wireless LAN of claim 22 wherein said second wireless LAN station includes:

a second media access control (MAC) device that controls transitions between said active mode and said low power mode; and

a second RF transceiver that communicates with said second MAC device, that transmits data for said second wireless LAN station during another of said assigned time slots during said active mode, that receives data from said other wireless LAN stations in said LAN during said active mode, and that transitions to said low power mode after receiving said data from said other wireless LAN stations.

25. The wireless LAN of Claim 23 wherein said first MAC device transitions said first wireless LAN station to said active mode prior to a timing beacon.

26. The wireless LAN of Claim 23 wherein said first MAC device transitions said first wireless LAN station to said low power mode prior to a subsequent beacon.

27. The wireless LAN of Claim 23 wherein after said transition to said active mode, said first MAC device updates network time.

28. The wireless LAN of Claim 27 wherein said network time is set equal to a prior beacon time plus a beacon interval minus a fixed delay.

29. The wireless LAN of Claim 28 wherein after said fixed delay and a backoff period, said first wireless LAN station transmits a beacon if said first wireless LAN station has not already received a beacon.

30. The wireless LAN of Claim 29 wherein said first wireless LAN station updates network time to match a time of said received beacon.

31. The wireless LAN of Claim 23 wherein said first wireless LAN station transmits at least one frame following a short interframe space during said assigned time slot.

32. The wireless LAN of Claim 23 wherein said assigned time slot occurs at least one of after a prior time slot expires, after a wireless LAN station with said prior time slot transmits a null frame, after a wireless LAN station with said prior time slot transmits a frame with a predetermined sequence number, and after a wireless LAN station with said prior time slot transmits a frame with a predetermined duration value.

33. The wireless LAN of Claim 23 wherein a Distributed Coordination Function (DCF) interval is provided after a last one of said wireless LAN stations transmits data and before said transition to said low power mode.

34. The wireless LAN of Claim 22 wherein said first and second wireless LAN stations are otherwise compliant with at least one of IEEE section 802.11, 802.11(a), 802.11(b), and 802.11(g).

35. The wireless LAN of Claim 22 wherein said first and second wireless LAN stations form an ad-hoc network.

36. The wireless LAN of Claim 22 wherein said first and second wireless LAN stations are mobile stations in an ad-hoc network.

37. A wireless station that communicates with at least one other station in a local area network (LAN), comprising:

media access control (MAC) means for controlling transitions between an active mode and a low power mode; and

radio frequency (RF) transceiver means that communicates with said MAC means for transmitting data after said transition to said active mode during a predetermined time slot that is assigned to said wireless LAN station and that is not assigned to other wireless LAN stations in said LAN.

38. The wireless LAN station of Claim 37 wherein said RF transceiver means receives data from said other wireless LAN stations in said LAN during said active mode and transitions to said low power mode after receiving said data from said other wireless LAN stations.

39. The wireless LAN station of Claim 37 wherein said MAC means transitions said wireless LAN station to said active mode prior to a timing beacon and transitions said wireless LAN station to said low power mode prior to a subsequent beacon.

40. The wireless LAN station of Claim 37 wherein after said transition to said active mode, said MAC means updates network time.

41. The wireless LAN station of Claim 40 wherein said network time is set equal to a prior beacon time plus a beacon interval minus a fixed delay.

42. The wireless LAN station of Claim 41 wherein after said fixed delay and a backoff period, said wireless LAN station transmits a beacon if said wireless LAN station has not already received a beacon.

43. The wireless LAN station of Claim 42 wherein said wireless LAN station updates network time to match a time of said received beacon.

44. The wireless LAN station of Claim 37 wherein said wireless LAN station transmits at least one frame following a short interframe space during said assigned time slot.

45. The wireless LAN station of Claim 37 wherein said assigned time slot occurs at least one of after a prior time slot expires, after a wireless LAN station with said prior time slot transmits a null frame, after a wireless LAN station with said prior time slot transmits a frame with a predetermined sequence number, and after a wireless LAN station with said prior time slot transmits a frame with a predetermined duration value.

46. The wireless LAN station of Claim 37 wherein a Distributed Coordination Function (DCF) interval is provided after a last one of said wireless LAN stations transmits data and before said wireless LAN stations transition to said low power mode.

47. The wireless LAN station of Claim 37 further comprising:

first voltage regulating means for regulating supply voltage during said active mode and for powering down during said low power mode; and

second voltage regulating means, which dissipates less power than said first voltage regulating means, for regulating supply voltage during said low power mode,

wherein said MAC means selects said first voltage regulating means during said active mode and said second voltage regulating means during said low power mode.

48. The wireless LAN station of Claim 47 further comprising:

baseband processing (BBP) means for performing radio frequency mixing and that communicates with said MAC means and said RF transceiver means;

first phase locked loop (PLL) means for generating a first clock signal for said BBP means during said active mode;

crystal oscillating means for generating a timing signal that is output to said first PLL means during said active mode,

wherein said RF transceiver means communicates with said BBP means and includes second PLL means for receiving said timing signal from said crystal oscillating means during said active mode and for generating a second clock signal for said RF transceiver means.

49. The wireless LAN station of Claim 48 further comprising first oscillating means for generating a third clock signal during said low power mode, wherein said first oscillating means dissipates less power than said crystal oscillating means.

50. The wireless LAN station of Claim 48 wherein when said MAC means initiates said low power mode, at least one of said first voltage regulating means, said RF transceiver means, said first PLL means, said second PLL means and said crystal oscillating means is shut down.

51. The wireless LAN station of Claim 49 wherein said MAC means includes counting means for counting and wherein when said MAC means initiates said low power mode, said second voltage regulating means powers said first oscillating means and said counting means, and wherein when said counting means reaches a predetermined count, said MAC means powers up at least two of said crystal oscillating means, said first voltage regulating means, said RF transceiver means, said first PLL means and said second PLL means.

52. The wireless LAN station of Claim 37 wherein said wireless LAN station is associated with a host that runs a multiplayer gaming application.

53. The wireless LAN station of Claim 49 further comprising baseband processing (BBP) means for calibrating said first oscillating means using said timing signal from said crystal oscillating means.

54. The wireless LAN station of Claim 48 wherein at least two of said BBP means, said first voltage regulating means, said second voltage regulating means, said RF transceiver means, said MAC means, and said first PLL means are implemented by a system on chip (SOC).

55. The wireless LAN station of Claim 37 wherein said wireless LAN stations are otherwise compliant with at least one of IEEE section 802.11, 802.11(a), 802.11(b), and 802.11(g).

56. The wireless LAN station of Claim 37 wherein said LAN is an ad-hoc network.

57. The wireless LAN station of Claim 37 wherein said wireless LAN stations are mobile stations in an ad-hoc network.

58. A wireless local area network (LAN), comprising:

first wireless means for selectively operating in low power and active modes, for initiating a LAN and for assigning predetermined time slots for transmitting data during said active mode;

second wireless means for communicating with said first wireless means, for receiving one of said predetermined time slots from said first wireless means for transmitting data and for transmitting data during said one of said predetermined time slots.

59. The wireless LAN of Claim 58 wherein said first wireless means includes:

first media access control (MAC) means that controls transitions between said active mode and said low power mode; and

first radio frequency (RF) transceiver means for communicating with said first MAC means, for transmitting data during one of said predetermined time slots during said active mode, for receiving data from said other wireless means in said LAN during said active mode, and for transitioning to said low power mode after receiving said data from said other wireless means.

60. The wireless LAN of claim 58 wherein said second wireless means includes:

second media access control (MAC) means for controlling transitions between said active mode and said low power mode; and

second RF transceiver means for communicating with said second MAC means, for transmitting data another of said assigned time slots during said active mode, for receiving data from said other wireless means in said LAN during said active mode, and for transitioning to said low power mode after receiving said data from said other wireless means.

61. The wireless LAN of Claim 59 wherein said first MAC means transitions said first wireless means to said active mode prior to a timing beacon.

62. The wireless LAN of Claim 59 wherein said first MAC means transitions said first wireless means to said low power mode prior to a subsequent beacon.

63. The wireless LAN of Claim 59 wherein after said transition to said active mode, said first MAC means updates network time.

64. The wireless LAN of Claim 63 wherein said network time is set equal to a prior beacon time plus a beacon interval minus a fixed delay.

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65. The wireless LAN of Claim 64 wherein after said fixed delay and a backoff period, said first wireless means transmits a beacon if said first wireless means has not already received a beacon.

66. The wireless LAN of Claim 65 wherein said first wireless means updates network time to match a time of said received beacon.

67. The wireless LAN of Claim 59 wherein said first wireless means transmits at least one frame following a short interframe space during said assigned time slot.

68. The wireless LAN of Claim 59 wherein said assigned time slot occurs at least one of after a prior time slot expires, after a wireless LAN station with said prior time slot transmits a null frame, after a wireless LAN station with said prior time slot transmits a frame with a predetermined sequence number, and after a wireless LAN station with said prior time slot transmits a frame with a predetermined duration value.

69. The wireless LAN of Claim 59 wherein a Distributed Coordination Function (DCF) interval is provided after a last one of said wireless means transmits data and before said transition to said low power mode.

70. The wireless LAN of Claim 58 wherein said first and second wireless means are otherwise compliant with at least one of IEEE section 802.11, 802.11(a), 802.11(b), and 802.11(g).

71. The wireless LAN of Claim 58 wherein said first and second wireless means form an ad-hoc network.

72. The wireless LAN of Claim 58 wherein said first and second wireless means are mobile stations in an ad-hoc network.

73. A method of operating a wireless station that communicates with at least one other wireless station in a local area network (LAN), comprising:

controlling transitions between an active mode and a low power mode; and

transmitting data after said transition to said active mode during a predetermined time slot that is assigned to said wireless LAN station,

wherein said predetermined time slot is not assigned to other wireless LAN stations in said LAN.

74. The method of Claim 73 further comprising:

receiving data from said at least one other wireless LAN station during said active mode; and

transitioning to said low power mode after receiving said data from other wireless LAN stations in said LAN.

75. The method of Claim 73 further comprising:

transitioning said wireless LAN station to said active mode prior to a timing beacon; and

transitioning said wireless LAN station to said low power mode prior to a subsequent beacon.

76. The method of Claim 73 further comprising updating network time after said transition to said active mode.

77. The method of Claim 76 further comprising setting said network time equal to a prior beacon time plus a beacon interval minus a fixed delay.

78. The method of Claim 77 further comprising transmitting a beacon if said wireless LAN station has not already received a beacon after said fixed delay and a backoff period.

79. The method of Claim 78 further comprising updating network time to match a time of said received beacon.

80. The method of Claim 73 further comprising transmitting at least one frame following a short interframe space during said assigned time slot.

81. The method of Claim 73 wherein said assigned time slot occurs at least one of after a prior time slot expires, after a wireless LAN station with said prior time slot transmits a null frame, after a wireless LAN station with said prior time slot transmits a frame with a predetermined sequence number, and after a wireless LAN station with said prior time slot transmits a frame with a predetermined duration value.

82. The method of Claim 73 further comprising providing a Distributed Coordination Function (DCF) interval after a last one of said wireless LAN stations transmits data and before said wireless LAN stations transition to said low power mode.

83. The method of Claim 73 further comprising:

regulating supply voltage during said active mode using a first voltage regulator that is powered down during said low power mode; and

using a second voltage regulator, which dissipates less power than said first voltage regulator, to regulate supply voltage during said low power mode; and

selecting said first voltage regulator during said active mode and said second voltage regulator during said low power mode.

84. The method of Claim 73 wherein said wireless LAN stations are otherwise compliant with at least one of IEEE section 802.11, 802.11(a), 802.11(b), and 802.11(g).

85. The method of Claim 73 wherein said LAN is an ad-hoc network.

86. The method of Claim 73 wherein said wireless LAN stations are mobile stations in an ad-hoc network.

87. A method of operating a wireless LAN including first and second wireless stations, comprising:

selectively operating the first wireless station in low power and active modes;

initiating a LAN between the first and second wireless stations;

assigning predetermined time slots for transmitting data to other wireless stations joining said LAN using the first wireless station;

receiving one of said predetermined time slots at the second wireless station for transmitting data; and

transmitting data during said one of said predetermined time slots using the second wireless station.

88. The method of Claim 87 further comprising transitioning the first wireless station to said active mode prior to a timing beacon.

89. The method of Claim 87 further comprising transitioning the first wireless station to said low power mode prior to a subsequent beacon.

90. The method of Claim 87 further comprising updating network time after said transition to said active mode.

91. The method of Claim 90 wherein said network time is set equal to a prior beacon time plus a beacon interval minus a fixed delay.

92. The method of Claim 91 further comprising transmitting a beacon if said first wireless station has not already received a beacon after said fixed delay and a backoff period.

93. The method of Claim 92 further comprising updating network time to match a time of said received beacon.

94. The method of Claim 87 further comprising transmitting at least one frame following a short interframe space during said assigned time slot.

95. The method of Claim 87 wherein said assigned time slot occurs at least one of after a prior time slot expires, after a wireless LAN station with said prior time slot transmits a null frame, after a wireless LAN station with said prior time slot transmits a frame with a predetermined sequence number, and after a wireless LAN station with said prior time slot transmits a frame with a predetermined duration value.

96. The method of Claim 87 further comprising providing a Distributed Coordination Function (DCF) interval after a last one of said wireless stations transmits data and before said transition to said low power mode.

97. The method of Claim 87 wherein the first and second wireless station are compliant with at least one of IEEE section 802.11, 802.11(a), 802.11(b), and 802.11(g).

98. The method of Claim 87 wherein the first and second wireless stations form an ad-hoc network.

99. The method of Claim 87 wherein the first and second wireless stations are mobile stations in an ad-hoc network.

100. The wireless LAN station of Claim 13 wherein said MAC device calibrates said first oscillator using said timing signal from said crystal oscillator.

101. The wireless LAN station of Claim 49 wherein said MAC means calibrates said first oscillating means using said timing signal from said crystal oscillating means.